Roads

I-690 Syracuse

Syracuse, NY

UNITED STATES

Owner
New York State Department of Transportation (NYSDOT)

Engineer
Terracon Consultants, Inc./Stantec

General contractor
Crane Hogan, Inc.

Dates of work
2017/09 2018/10

Main figures

Controlled Modulus Columns (CMC)™
3500 EA.

Description

Interstate-690 has been serving the northwest suburbs of Syracuse and Onondaga County since its completion in the early 1970s. In 2016, a multi-phase, $65 million rehabilitation project was proposed for the aging expressway. The New York State Department of Transportation (NYSDOT) sought to reconstruct a ¾-mile section of the highway, including replacement of a 1,500-foot viaduct -- or elevated highway -- spanning Beech Street; replacement of the bridge over Teall Avenue; improvement of Exit 14 at Teall Avenue. The “I-690 over Teall Avenue and Beech Street Bridge Replacement Project” was needed to address both structural deficiencies on that segment of I-690, and safety and operational deficiencies at the Teall Avenue interchange.

Due to the compressible nature of the soils at the site, settlement was predicted unless ground improvement was provided. Menard Group USA was contracted to support a new double-sided Mechanically Stabilized Earth (MSE) wall to replace the existing viaduct along I-690 over Teall Avenue and Beech Street. The selected technique was Controlled Modulus Column (CMC)™ rigid inclusions.

Ground conditions

The soil consists of loose urban fill, over organic silt and peat, over silts and clays, underlain by glacial till and/or bedrock.

Solution

The project was done in two phases: Westbound I-690 was completed in the fall of 2017; eastbound I-690 in the summer of 2018. Phase 1 included the installation of approximately 2,000 CMCs on the north side of the MSE embankment wall. The viaduct was left in place during this phase. Phase 2 included the installation of approximately 1,500 CMCs which supported the south side of the MSE wall embankment. The walls, constructed along 1,500 LF of highway, ranged in height from 12-21 ft. Maximum design bearing pressures reached 7 ksf. The CMCs terminated at an average depth of 34 ft and a maximum depth of 40 ft.

This ground improvement solution reduced post-construction settlement to acceptable levels and improved the bearing capacity of the MSE retaining wall -- designed by The Reinforced Earth Company, a sister company of Menard and member of the Soletanche Freyssinet Group. This was the first design-build CMC rigid inclusion project performed for the NYSDOT. The project, though, was not without its challenges, including a strict for completion and working alongside an existing viaduct. By utilizing a crew that had significant experience working on highway projects, Menard overcame any schedule concerns. Careful coordination with Menard’s design team averted potential issues associated with working near the viaduct.

For a major highway project, Menard successfully supported a double-sided MSE wall, meeting the NYSDOT’s requirements for quality, safety and schedule.